DiversityMobile – Mobile Data Retrieval Platform for Biodiversity Research Projects

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A large number of biodiversity research projects depend on field mapping and ecological data of high quality. Therefore it is necessary to link data sets gathered in the field on-the-spot with verified backbone information from existing biological, taxonomic or environmental data sources, e.g., lists of taxonomic names. Further on, there is a need to link additional information like GPS coordinates and multimedia information like image or sound data to the datasets immediately during data gathering. For these reasons, it makes sense to establish a seamless and transparent flow of data from the field into a central data storage system which, in a joint project, may be used by many participants. Seamless in the sense that data are available shortly after being gathered, transparent in the sense that every operation applied to data can be traced back (data provenance). For these core requirements, a mobile application used to gather biological research data in the field and to enable the dataflow to a data repository is developed.

The application *DiversityMobile* is currently set up as such a mobile system used for entering, modifying, or - if necessary - even deleting ecological and biological monitoring data immediately in the field. It is capable of accomplishing the core requirements mentioned above. For reasons of model consistency the mobile client that is developed uses a subset of the database model of the central database of the Diversity Workbench framework. The main entries of this simplified model are described and their relevance for gathering data is explained. The architecture of the *DiversityMobile* application with its four layers and its connectivity to the central database system is outlined, and reasons are given why it was implemented in that way. The process of synchronization between a mobile database and a large, central database is described in detail. The basic technology is the identification of data items with GUIDs and the adjustment of hash values of data items in the central database and on the mobile device. To keep track of data change history, a supplementary synchronization database is introduced.

DiversityMobile is currently tested in the context of several data gathering use cases. Within one of these projects, ecological plant-insect interactions are recorded. This complex scenario is described as use case in some detail, and the requirements on the data structure and dependency due to a great number of spatial-temporal interrelations between the data are depicted. Within the next two years additional features will be implemented and the mobile data retrieval platform for biodiversity research projects will be extended.